## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claims 1-23, 34-38 and 40-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirakata (US 2002/0067332) in view of Shirahama (US 7,151,572).

Regarding **Claim 1**, Hirakata teaches a liquid crystal display device, comprising:

a section that detects a type of content of an image to be displayed on a liquid crystal display panel (Hirakata, paragraph [0031]); and

a section that variably controls the illumination duration of a backlight within one frame period based on the detected type of the content of the image (Hirakata paragraph [0032] backlight changes lighting modes when a motion picture is detected, Fig. 9A-9E, all the periods shown in Figs. 9C - 9D are the same, *one frame*, but the duty cycle of the pulses are changed).

wherein the image signal to be displayed is written into a liquid crystal display panel while a backlight is activated intermittently within the one frame period (Hirakata, Figs. 1A-1E).

for a type of content of an image that entails a large amount of motion blur, the corresponding illumination duration is decreased within the one frame period (Hirakata, paragraph [0034], larger motion equals smaller duty cycle), and

for a type of content of an image that entails a small amount of motion blur, the corresponding illumination duration is increased within the one frame period (Hirakata, paragraph [0034], smaller motion equals larger duty cycle).

Hirakata fails teach:

that the detecting is based on information other than the image signal to be displayed, the detected type of content being based on classification defined in electronic program information;

a section that stores a plurality of predetermined illumination duration which respectively correspond to possible types of content of an image; and

the variably controlling is based on the detected type of content of the image according to the stored illumination duration which corresponds to the detected type of content of the image.

Shirahama teaches:

that the detecting is based on information other than the image signal to be displayed, the detected type of content being based on classification defined in electronic program information (Shirahama, Col. 3 lines 50-58 detects the type of content retrieved from EPG);

a section that stores a plurality of predetermined brightness settings which respectively correspond to possible types of content of an image (Shirahama, Figs. 4 and 5 presets for each type of content are stored in memory); and

the variably controlling is based on the detected type of content of the image according to the stored brightness settings which corresponds to the detected type of content of the image (Shirahama, Figs. 4 and 5 presets are loaded when the type of content is detected).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the type of content detection and display image optimization technique in combination with the brightness adjustment system of Hirakata in order to provide a more optimized and automatic adjustment for each type of content of image being displayed by the LCD.

It should be noted that Shirahama specifically teaches storing brightness settings but does not specifically teach storing illumination durations. However Hirakata teaches variable duties cycles that make up different brightness settings, therefore the references taken together would meet the limitations of storing and controlling the variable illumination durations according to the type of content being displayed.

Regarding **Claim 11**, Hirakata teaches a liquid crystal display device, comprising:

a section for detecting a type of content of the image to be displayed on the liquid crystal display panel (Hirakata, paragraph [0031]); and

a section that variably controls the duration in which a black display signal is supplied to the liquid crystal display panel based on the detected type of the content of the image (Hirakata, Figs. 1A-1E, paragraph [0128]).

wherein an image signal to be displayed and a black display signal are written into a liquid crystal display panel within one frame period (Hirakata, Figs. 1A-1E, paragraph [0128]).

Hirakata fails teach:

that the detecting is based on information other than the image signal to be displayed, the type of content being based on classification defined in electronic program information;

a section that stores a plurality of predetermined illumination duration which respectively correspond to possible types of content of an image; and

variably controlling both the black display signal as well as the illumination duration based on the detected type of content of the image according to the stored illumination duration which corresponds to the detected type of content of the image.

Shirahama teaches:

a section that detects a type of content of an image to be displayed (Shirahama Figs. 4 and 5, type of content detection);

that the detecting is based on information other than the image signal to be displayed, the type of content being based on classification defined in electronic program information (Shirahama, Col. 3 lines 50-58 the type of content of the image retrieved from EPG);

a section that stores a plurality of predetermined brightness settings which respectively correspond to possible types of content of an image (Shirahama, Figs. 4 and 5 presets for each types of content are stored in memory); and

variably controlling both the black display signal as well as the illumination duration based on the detected type of content of the image according to the stored illumination duration which corresponds to the detected type of content of the image (Shirahama, Figs. 4 and 5 presets are loaded when type of content is detected).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the type of content detection and display image optimization technique in combination with the brightness adjustment system of Hirakata in order to provide a more optimized and automatic adjustment for each type of content of image being displayed by the LCD.

It should be noted that Shirahama specifically teaches storing brightness settings but does not specifically teach storing illumination durations. However Hirakata teaches variable duties cycles that make up different brightness settings, therefore the references taken together would meet the limitations of storing and controlling the variable illumination durations according to type of content. Also the black display duration is inversely proportional to the illumination duration which means it would also be based on the detected type of content.

Regarding **Claim 18**, Hirakata teaches a liquid crystal display device comprising:

a section for detecting a type of content of an image to be display on a liquid crystal display panel (Hirakata, paragraph [0031]), and

a section for variably controlling a ratio of display duration of the image display in one frame period, based on the detected type of the content of the image (Hirakata, paragraph [0032]).

wherein display duration of an image signal and non-display duration are provided in one frame period (Hirakata, Figs. 1A-1E).

Hirakata fails teach:

a section that detects a type of content of an image to be displayed;

that the detecting is based on information other than the image signal to be displayed, the type of content being based on classification defined in electronic program information;

a section that stores a plurality of predetermined illumination duration which respectively correspond to possible type of contents of an image; and

variably controlling both the black display signal as well as the illumination duration based on the detected type of content of the image according to the stored illumination duration which corresponds to the detected type of content of the image.

Shirahama teaches:

a section that detects a type of content of an image to be displayed (Shirahama Figs. 4 and 5, type of content detection);

that the detecting is based on information other than the image signal to be displayed, the type of content being based on classification defined in electronic program information (Shirahama, Col. 3 lines 50-58 type of content retrieved from EPG);

a section that stores a plurality of predetermined brightness settings which respectively correspond to possible type of contents of an image (Shirahama, Figs. 4 and 5 presets for each type of content are stored in memory); and

variably controlling both the ratio of display duration of the image signal as well as the illumination duration based on the detected type of content of the image according to the stored illumination duration which corresponds to the detected type of content of the image (Shirahama, Figs. 4 and 5 presets are loaded when type of content is detected).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the type of content detection and display image optimization technique in combination with the brightness adjustment system of Hirakata in order to provide a more optimized and automatic adjustment for each type of content of image being displayed by the LCD.

It should be noted that Shirahama specifically teaches storing brightness settings but does not specifically teach storing illumination durations. However Hirakata teaches variable duties cycles that make up different brightness settings, therefore the references taken together would meet the limitations of storing and controlling the variable illumination durations according to type of content. Also the ratio proportional to the illumination duration which means it would also be based on the detected type of content.

Regarding **Claim 35 and 36,** Hirakata teaches a liquid crystal display device, comprising:

a section for detecting a type of content of the image to be displayed on the liquid crystal display panel (Hirakata, paragraph [0031]); and

a section for variably controlling the duration in which a black display signal is supplied to the liquid crystal display panel based on the detected type of the content of the image (Hirakata, Figs. 1A-1E, paragraph [0128]);

wherein the image signal to be displayed and a black display signal are written into a liquid crystal display panel within one frame period (Hirakata, Figs. 1A-1E and 8A-8D, the black levels are dependent on the backlight illumination times and adjusting the black levels then adjusts the image signals in turn when ever there is no image signal the display is displaying a black signal).

the gray scale levels of the input image and the gray scale voltages applied to the display crystal display panel in response to the input image signal are varied depending on the application of the black display signal such that a relationship between the input image signal and the display brightness is held constant (Hirakata, Figs. 1A-1E, 8A-8D).

Hirakata fails to disclose a section for detecting a user's instructional input. Shirahama discloses a section for detecting a user's instructional input which defines the type of image to be displayed as well as changing the brightness setting according to the user's instructional input Shirahama, Col. 2 lines 34-3.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Hirakata, and have the input be user instructional input,

as taught by Shirahama, thus enabling the user to adjust the display brightness *in addition* to the automatic adjustments made by Hirakata.

Regarding **40 and 41**, Hirakata teaches a liquid crystal display device, comprising:

a section for detecting a type of content of the image to be displayed on the liquid crystal display panel (Hirakata, paragraph [0031]); and

a section that variably controls a ratio of display duration of an image signal within one frame period, based on the detected type of the content of the image (Hirakata, Figs. 1A-1E, paragraph [0128]);

wherein the display duration of the image signal and the non-display duration are provided in the one frame period (Hirakata, Figs. 1A-1E and 8A-8D, the black levels are dependent on the backlight illumination times and adjusting the black levels then adjusts the image signals in turn when ever there is no image signal the display is displaying a black signal).

the gray scale levels of the input image and the gray scale voltages applied to the display crystal display panel in response to the input image signal are varied depending on the ratio of the display duration of the image signal in the one frame period such that a relationship between the input image signal and the display brightness is held constant (Hirakata, Figs. 1A-1E, 8A-8D).

Hirakata fails to disclose a section for detecting a user's instructional input. Shirahama discloses a section for detecting a user's instructional input which defines

the type of image to be displayed as well as changing the brightness setting according to the user's instructional input Shirahama, Col. 2 lines 34-3.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Hirakata, and have the input be user instructional input, as taught by Shirahama, thus enabling the user to adjust the display brightness *in addition* to the automatic adjustments made by Hirakata.

Regarding **Claim 2**, Hirakata further teaches wherein the backlight emits a flash of light over the full screen every one frame period in synchronization with a vertical synchronizing signal supplied to the liquid crystal panel (Hirakata, Figs. 1A-1E backlight is synced with the vsync signal).

Regarding **Claim 3**, Hirakata further teaches that the backlight is operated so that multiple luminous sections are activated one to the next, scan wise in synchronization with vertical and horizontal synchronizing signals supplied to the liquid crystal display panel (Hirakata, Figs. 17B).

Regarding **Claim 4, 12 and 34**, Hirakata further teaches that the luminous intensity of the backlight is varied in accordance with the illumination duration of the backlight and the application duration of the black display signal (Hirakata, Figs. 1A-1E paragraph [0110]).

Regarding **Claim 5, 6, 13, 14, 19 and 20**, Hirakata further teaches wherein gray scale levels of the input image signals and the gray scale voltages applied to the liquid crystal display panel in response to the input image signal are varied depending on the illumination duration of the backlight, the application duration of the black display signal

and the ratio of the display duration of the image signal in the one frame period, such that the input image signal and the display brightness is held constant (Hirakata, Figs. 9A-9B, paragraphs [0031-0032, 0110] gray signals and black signals change when backlight changes amplitudes change to maintain brightness).

Regarding **Claim 7**, Hirakata in view of Shirahama further teaches wherein the frame frequency of the input image signal is varied based on the type of content of the image (Hirakata, paragraph [0110], Shirahama Figs. 5A and 5B).

Regarding **Claims 8, 15 and 21**, Hirakata in view of Shirahama further teaches that the electronic program information is included in program guide information included in broadcast data (Shirahama, Col. 3 lines 50-58 type of contents retrieved from EPG).

Regarding **Claim 9, 16 and 22**, Hirakata in view of Shirahama further teaches wherein electronic program information is included in contents information obtained from external media (Hirakata, paragraph [0010] television is considered external media motion picture is detection from the contents information which is the image, Shirahama Figs. 5A and 5B).

Regarding **Claim 10, 17 and 23**, Hirakata in view of Shirahama further teaches that the electronic program information is based on video source select command information input by the user (Shirahama, Col. 2 lines 34-36).

Regarding **Claims 37, 38, 42 and 43**, Hirakata in view of Shirahama further teaches that the application duration of the black display signal as well as the ratio of the display duration in the one frame period are varied (Hirakata, paragraphs [0031-

0032, 0110] gray signals and black signals as well as display light ratio change when backlight changes) based on video source select command or video adjustment command information input by the user (Shirahama, Col. 2 lines 34-36).

Regarding **Claim 44**, Hirakata further teaches wherein the luminous intensity of a backlight that illuminates the LCD panel is varied accordance with the application duration of the black display signal (Hirakata, Figs. 8A-8D).

Regarding **Claims 45 and 46**, Hirakata in view of Shirahama further teaches wherein the application duration of the black display signal is varied (Hirakata, Figs. 8A-8D) based on video source select command and/or video adjustment command information input by the user (Shirahama, Col. 2 lines 34-36).

Regarding **Claims 47 and 48**, Hirakata in view of Shirahama further teaches wherein the ratio of the display duration of the image signal in the one frame period is varied (Hirakata, Figs. 1A-1E and 8A-8D) based on video source select commander and/or video adjustment command information input by the user (Shirahama, Col. 2 lines 34-36).

Regarding **Claims 49 and 50**, Hirakata in view of Shirahama further teaches wherein the plurality of predetermined illumination duration are set in such a manner that when the type of content of the image entails a large amount of motion blur, the corresponding illumination duration is decreased within the one frame period, and when the type of content of the image entails a small amount of motion blur, the corresponding illumination duration is increased within the one frame period (Hirakata, Figs. 9A-9E, paragraph [0034] and Shirahama, Fig. 5A and 5B).

***Response to Arguments***

Applicant's arguments filed October 30th 2009 have been fully considered but they are not persuasive.

With regards to Claim 1, the applicant argues that the prior art fails to teach the newly added limitations of "the stored plurality of predetermined illumination ... within one frame period". Specifically, prior art fails to teach storing predetermined illumination durations such that for a specific content type that has large and small amounts of motion blur using decreased and increased illumination durations respectively. The examiner argues that this is clearly taught by the combination of the Hirakata in view of Shirahama. Hirakata clearly teaches using decreased illumination for high motion blur and increased illumination for low motion blur, the amount of motion blur present in the image can be considered a type of content, wherein the type is none, low, moderate, or high motion blur. Hirakata only fails to teach retrieving the content from an EPG which Shirahama clearly teaches, specifically teaching that content information including motion blur and brightness control can both be retrieved from an EPG. Said combination satisfies the claimed invention. The rejection is therefore maintained.

Regarding the remaining independent claims, the applicant argues that prior art fails to teach, specifically for claim 11 "a section that variably controls the duration in which a black display signal is supplied to the liquid crystal display panel", or similar limitations in the rest of the independent claims. But instead teaches a variable controller for the backlight which is not considered a "display signal" supplied to the

"liquid crystal display panel". The examiner believes that the applicant is using a more narrow interpretation of the claims. The claims do not specify exactly what the liquid crystal display panel consists of. There is no mention of data/gate drivers or voltage electrodes, but merely a signal being supplied to a display panel. The examiner believes the broad interpretation of "a black display signal" to be an off signal for the backlight which will clearly display black or dark when not operative, to be appropriate. Additionally the examiner is interpreting the "liquid crystal display panel" to encompass the backlight device as well; therefore the "black display signal" is being supplied to the "liquid crystal display panel". The same reasoning can be applied to other similar independent claims that deal with display or image signals, because the signals being provided to the backlight can be considered image signals since they inherently affect the brightness of the image.

Applicant's arguments with respect to claims 49 and 50 have been considered but are moot in view of the new ground(s) of rejection.

## ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ke Xiao whose telephone number is (571)272-7776. The examiner can normally be reached on Monday through Friday from 8:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ke Xiao/
Examiner, Art Unit 2629